

## **NAS5-97066 Quarterly Report 4 of 8**

**28 January 1998**

### **PROGRESS REPORT FOR ASTROPHYSICS DATA PROGRAM CONTRACT NAS5-97066**

**by S. Terebey, Extrasolar Research Corp.**

Progress report for the astronomy research proposal entitled "The Contribution of Ionizing Stars to the Far-Infrared and Radio Emission in the Galaxy"

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### **PROGRESS FOR 1997 QUARTER 4, Nov 97 - Jan 98**

The fourth quarter sees steady progress, with two research papers nearing completion, and research analysis continuing for the next stage of planned research, a quantitative study of the W4 HII region.

A referee's report was received from the Astrophysical Journal. Terebey completed her revisions of the manuscript entitled "The Anatomy of the Perseus Spiral Arm: 12CO and IRAS Imaging Observations of the W3/4/5 Cloud Complex". The paper awaits final touches from coauthor Dr. Mark Heyer (University of Massachusetts).

A referee's report was received from the IEEE Transactions on Image Processing. This quarter the manuscript was revised and sent back to the journal. The manuscript is entitled "Cross Log Entropy Maximization and Its Application to Ringing Suppression in Image Reconstruction," by authors Dr. Yu Cao of Caltech, Dr. Paul Eggermont of University of Delaware, and Dr. Susan Terebey.

Terebey continued analysis work on the next research task, to develop a comprehensive physical picture for the W4 region. W4 is a large HII region whose unusual structure promises to shed light on how massive stars deposit energy and momentum into the interstellar medium. Its ring-like appearance in the infrared (IRAS) and radio continuum (6cm DRAO) images suggest an interpretation where vigorous stellar winds are responsible for evacuating a cavity, pushing the interstellar material outward into a thin exterior shell.

This quarter's activity was to perform a quantitative comparison of the 6cm and IRAS images using IDL to investigate the 2-dimensional (i.e. projected on the sky) structure. Software was developed to measure the 6cm versus IRAS correlation, as well as to display images of the high and low correlation areas.

### **PROBLEMS FOR 1997 QUARTER 4**

There were no significant problems encountered this quarter.

## **PLANS FOR 1998 QUARTER 1**

Next quarter's goals are to make progress in the following areas of the W4 HII region research:

1. Develop simple physical models to test against the data to determine whether the emission forms a spherical shell, or an incomplete shell such as a loop of material.
2. Look for the source of ionization to test whether the Perseus OB cluster is indeed the source of ionizing photons.

# REPORT DOCUMENTATION PAGE

Form Approved  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.

1. AGENCY USE ONLY (Do not enter)		2. REPORT DATE 1/28/98	3. REPORT TYPE AND DATES COVERED Quarterly Progress	
4. TITLE AND SUBTITLE "The Contribution of Ionizing Stars to the Far-Infrared and Radio Emission in the Galaxy"			5. FUNDING NUMBERS NAS5-97066  IN-93 349 326	
6. AUTHOR(S)  Dr. Susan Terebey				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)  Extrasolar Research Corporation 720 Magnolia Ave. Pasadena CA 91106-3624			8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES) NASA Goddard Space Flight Center Green Belt MD 20771 Attn: Jim Debelius, Code 216, Space Sci Procurement Office Attn: Dot Appleman, NASA Astrophysics Data Program			10. SPONSORING/MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION/AVAILABILITY STATEMENT  NASA			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words)  S. Terebey describes research activities undertaken during the fourth quarterly reporting period. These include the revision of two research manuscripts in response to referee's comments: "The Anatomy of the Perseus Spiral Arm: 12CO and IRAS Imaging Observations of the W3/4/5 Cloud Complex", with coauthor Dr. Mark Heyer of the University of Massachusetts, and also, "Cross Log Entropy Maximization and Its Application to Ringing Suppression in Image Reconstruction," with coauthors Dr. Yu Cao of Caltech and Dr. Eggermont of University of Delaware.				
14. SUBJECT TERMS			15. NUMBER OF PAGES 3	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT Unclassified	18. SECURITY CLASSIFICATION OF THIS PAGE Unclassified	19. SECURITY CLASSIFICATION OF ABSTRACT Unclassified	20. LIMITATION OF ABSTRACT SAR	